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CODEX COMMITTEE ON PESTICIDE RESIDUES

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DISCUSSION PAPER ON THE IMPACT OF THE RELOCATION OF *VIGNA* SPP. UNDER BEANS
ON THE CXLs FOR PEAS

(Prepared by Thailand)

Codex members and observers are kindly invited to consider the considerations and recommendations of this paper when submitting comments on Agenda Items 8(a) and 8(b) (see CX/PR 16/48/7).

Background

1. The 47th Session of the Codex Committee of Pesticide Residues considered the Classification of the Crop Classification on Group 14: Legumes Vegetables and Group 15: Pulses. Thailand recognized that in current version beans, *Vigna* spp., is classified in the same code as peas, *Pisum* spp. The CXLs of peas in the Legume Vegetables and Pulses cover the beans *Vigna* spp. However, in this revising version, *Vigna* spp. will be moved to Beans. Thailand, therefore, would like to seek the clarification on the review of the MRLs according to the new Codex Classification to be applied to beans, *Vigna* spp.
2. To consider the implications of classifying all *Vigna* spp. under the Beans (dry) sub-group on existing CXLs established for *Vigna* spp. currently classified as Peas (dry). In this regard, the Committee recalled its earlier decision during the 45th Session that no changes would be made to existing CXLs until such a time JMPR would revise them following the procedures in place for the establishment of Codex schedules and priority list of pesticides, and that the same approach would be taken when reviewing other commodity groups in the database following the adoption of revised commodity groups in the Classification.
3. The Committee agreed to retain two separate codes for Beans (*Phaseolus* spp.) and Beans (*Vigna* spp.) awaiting the conclusions and recommendations of the discussion paper on the impact of the relocation of *Vigna* spp. under the Beans on the CXLs for Peas for both dry (mature) and immature commodities for consideration by the next CCPR.

Purpose

4. The aims of this discussion paper are:
 - to identify the impact of the relocation of *Vigna* spp. from Peas to be under the Beans and
 - to propose the recommendation on how to apply existing CXLs of legumes and pulses for *Vigna* spp. to prevent the impediment to international trade of legumes and pulses of *Vigna* spp.

Impact of the relocation of *Vigna* spp. from peas to beans

5. Current Codex Classification of Foods and Animal Feeds has been established since 1993. Now CCPR is in the process of revising the Codex Classification, and the revision of Group 014 Legume Vegetables and Group 015 Pulses are at step 4 and 7, respectively. The comparison of the current and proposed revising versions related to *Pisum* spp. and *Vigna* spp. and *Phaseolus* spp. is in the following Table 1.

Table 1: The comparison of the current and proposed revising versions of Codex Classification of Foods and Animal Feeds related to *Pisum* spp. and *Vigna* spp. and *Phaseolus* spp.

Codex Classification of Foods and Animal Feeds (1993)		Proposed revised Codex Classification of Foods and Animal Feeds	
Group 014 Legume Vegetables Group 014 Legume vegetables are derived from the succulent seed and immature pods of leguminous plants commonly known as beans and peas		Group 014 Legume Vegetables Group 014 Legume vegetables are derived from the succulent seed and immature pods of leguminous plants commonly known as beans and peas	
Code No.	Commodity	Code No.	Commodity
VP 0060	Legume vegetables	VP 0060	Legume vegetables
Codex Classification of Foods and Animal Feeds (1993)		Proposed revised Codex Classification of Foods and Animal Feeds	
		Subgroup 14A Beans with pods	
		VP 2060	Beans with pods (includes all commodities in this subgroup)
VP 0061	Beans, except broad bean and soya bean (green pods and immature seeds) <i>Phaseolus</i> spp.	VP 0061	Beans (<i>Phaseolus</i> spp.) (young pods and succulent seeds)
		VP 2840	Beans with pods (<i>Vigna</i> spp.) (young pods and succulent seeds)
		Subgroup 14B Peas with pods	
		VP 2061	Peas with pods (includes all commodities in this subgroup)
VP 0063	Peas (pods and succulent = immature seeds) <i>Pisum</i> spp.; <i>Vigna</i> spp.	VP 0063	Peas (pods and succulent seeds) <i>Pisum</i> spp.
		Subgroup 14C Succulent beans without pods	
		VP 2062	Succulent beans without pods (includes all commodities in this subgroup)
VP 0062	Beans, shelled (succulent = immature seeds) <i>Phaseolus</i> spp.	VP 0062	Beans without pods (<i>Phaseolus</i> spp.) (succulent seeds)
		VP 2843	Beans without pods (<i>Vigna</i> spp.) (succulent seeds)
		Subgroup 14D Succulent peas without pods	
		VP 2063	Succulent peas without pods (includes all commodities in this subgroup)
VP 0064	Peas, shelled (succulent seeds) <i>Pisum</i> spp.; <i>Vigna</i> spp.	VP 0064	Peas without pods (succulent seeds) <i>Pisum</i> spp.

Codex Classification of Foods and Animal Feeds (1993)		Proposed revised Codex Classification of Foods and Animal Feeds	
Group 015 Pulses Group 015Pulses are derived from the mature seeds, naturally or artificially dried, of leguminous plants known as beans (dry) and peas (dry).		Group 015 Pulses Group 015Pulses are derived from the mature seeds, naturally or artificially dried, of leguminous plants known as beans (dry) and peas (dry). Pulses are dry seeds without the pods.	
Codex Classification of Foods and Animal Feeds (1993)		Proposed revised Codex Classification of Foods and Animal Feeds	
Code No.	Commodity	Code No.	Commodity
VD 0070	Pulses	VD 0070	Pulses
		Subgroup 015A Dry beans	
		VD 2065	Dry beans (includes all commodities in this subgroup)
VD 0071	Beans(dry) <i>Phaseolus</i> spp.; several species and cultivars	VD 0071	Beans (<i>Phaseolus</i> spp.) (dry) <i>Phaseolus</i> spp.; several species and cultivars
		VD 2891	Beans (<i>Vigna</i> spp.) (dry) <i>Vigna</i> spp.; several species and cultivars
		Subgroup 015B Dry peas	
		VD 2066	Dry peas (includes all commodities in this subgroup)
VD 0072	Peas(dry) <i>Pisum</i> spp.; <i>Vigna</i> spp.	VD 0072	Peas (dry) <i>Pisum</i> spp.

It can be seen from Table 1 that *Vigna* spp. was previously classified in Peas with the same code as *Pisum* spp. However, in this revising version, *Vigna* spp. will be moved to Beans and set a code number different from beans, *Phaseolus* spp. This may lead to the problems in the application of MRLs for *Vigna* spp.

6. There are several varieties of *Vigna* spp., under the proposed revision of Group 014 Legume Vegetables and Group 015 Pulses, that are important to the global trade. The examples are as follows:

- Adzuki bean (*Vigna angularis* (Willd.) Ohwi & Ohashi)
- Catjang (*Vigna unguiculata* (L.) Walp. subsp. *cylindrical* (L.) Verdc.)
- Cowpea (*Vigna unguiculata* (L.) Walp. subsp. *unguiculata*)
- Moth bean (*Vigna aconitifolius* (Jacq.) Verde.)
- Mung bean (*Vigna radiata* (L.) Wilczek, var. *radiata*)
- Rice bean (*Vigna umbellata* (Thunb.) Ohwi eg Ohashi)
- Urd bean (*Vigna mungo* (L.) Hepper var. *mungo*)
- Yard-long bean (*Vigna unguiculata* subsp. *sesquipedalis* (L.) Verdc.)

In the FAOSTAT database (2016a, 2016b), the production and trade of total beans and peas are recorded. There is some information specific for few individual commodities. For *Vigna* spp., available data is for cowpea, dry (global production volume is 8.03 million tonnes in 2013). The global production and trade of beans and peas are shown in Figure 1, 2 and 3.

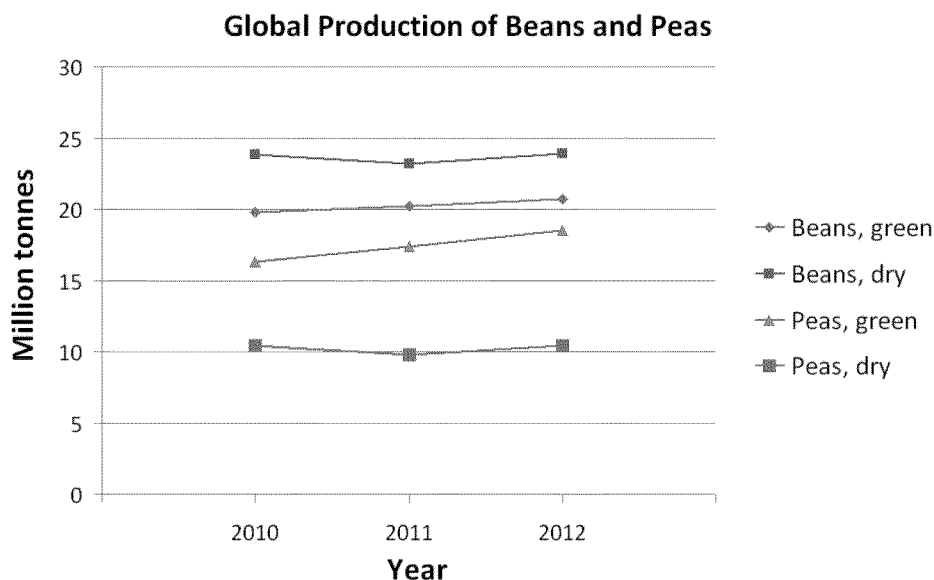


Figure 1: The production of the legume vegetables and pulses during 2010-2012 (FAO STAT, 2016a)

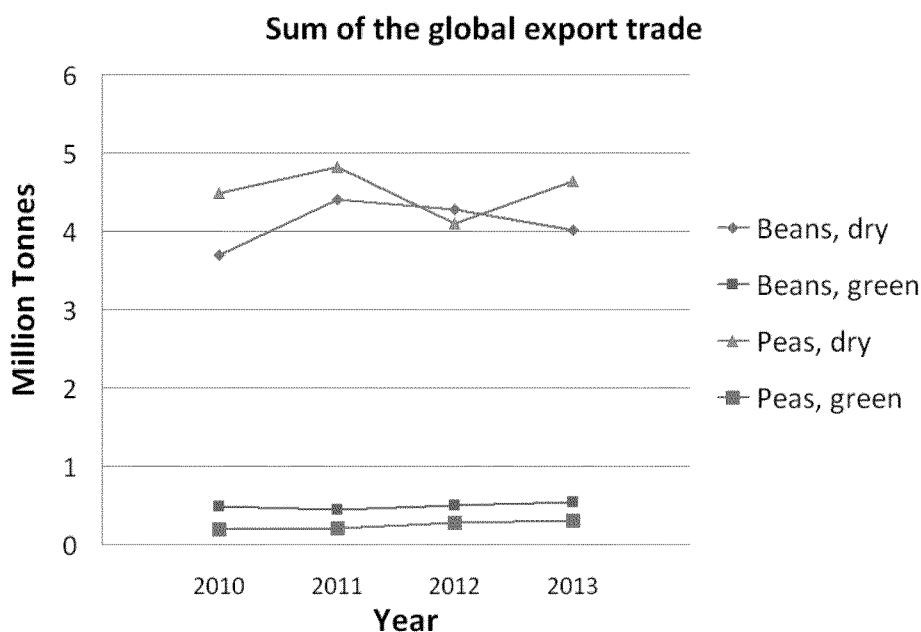


Figure 2: Total of the global export trade during 2010-2013 (FAO STAT, 2016b)

Note: Bean, dry includes *Phaseolus* spp.: kidney, haricot bean (*P. vulgaris*); lima, butter bean (*P. lunatus*); adzuki bean (*P. angularis*); mungo bean, golden, green gram (*P. aureus*); black gram, urd (*P. mungo*); scarlet runner bean (*P. coccineus*); rice bean (*P. calcaratus*); moth bean (*P. aconitifolius*); tepary bean (*P. acutifolius*). Only species of *Phaseolus* should be included, though several countries also include certain types of beans. Commonly classified as *Vigna* (*angularis*, *mungo*, *radiata*, *aconitifolia*). In the past, these species were also classified as *Phaseolus*.

Beans, green includes *Phaseolus* and *Vigna* spp. for shelling.

Peas, dry includes Garden pea (*Pisum sativum*); field pea (*P. arvense*).

Peas, green includes *Pisum sativum*. Mostly for shelling, but including edible - podded peas or sugar peas.

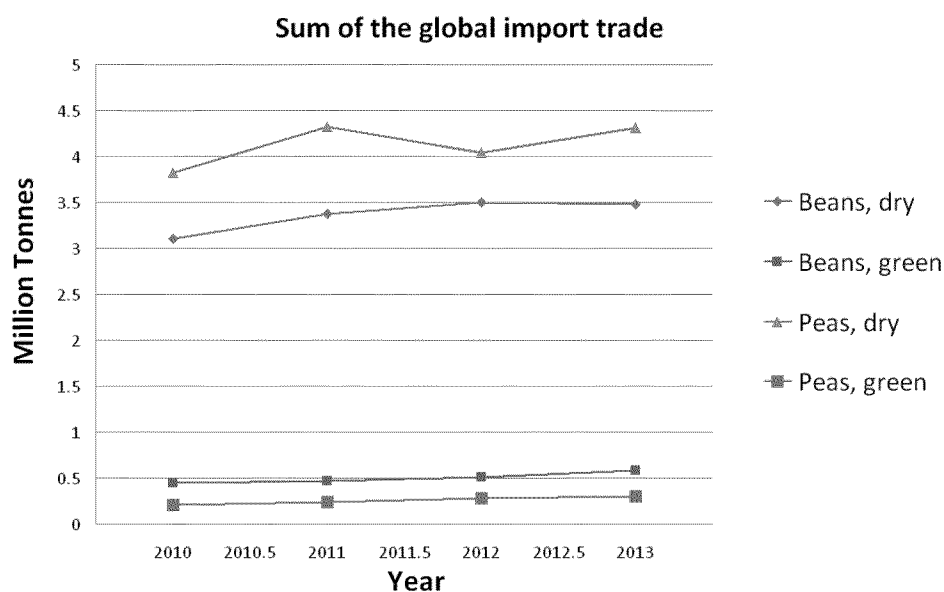


Figure 3: Total of the global import trade during 2010-2013 (FAO STAT, 2016b)

Note: **Bean, dry** includes *Phaseolus* spp.: kidney, haricot bean (*P. vulgaris*); lima, butter bean (*P. lunatus*); adzuki bean (*P. angularis*); mungo bean, golden, green gram (*P. aureus*); black gram, urd (*P. mungo*); scarlet runner bean (*P. coccineus*); rice bean (*P. calcaratus*); moth bean (*P. aconitifolius*); tepary bean (*P. acutifolius*). Only species of *Phaseolus* should be included, though several countries also include certain types of beans. Comm only classified as *Vigna* (*angularis*, *mungo*, *radia ta*, *aconitifolia*). In the past, these species were also classified as *Phaseolus*.

Beans, green includes *Phaseolus* and *Vigna* spp. for shelling.

Peas, dry includes Garden pea (*Pisum sativum*); field pea (*P. arvense*).

Peas, green includes *Pisum sativum*. Mostly for shelling, but including edible - podded peas or sugar peas.

- 7 Existing CXLs related to legume vegetables and pulses, *Pisum* spp., *Vigna* spp. and *Phaseolus* spp. are shown as Table 2 and 3.

Table 2: CXLs for legume vegetables related to *Pisum* spp. and *Vigna* spp. and *Phaseolus* spp.

Pesticide	CXL (mg/kg)				
	VP 0060 ^{1/} Legume vegetables	VP 0061 Beans (<i>Phaseolus</i> spp.)	VP 0062 Beans, shelled (<i>Phaseolus</i> spp.)	VP 0063 Peas (<i>Pisum</i> spp.; <i>Vigna</i> spp.)	VP 0064 Peas, shelled (<i>Pisum</i> spp.; <i>Vigna</i> spp.)
Azoxystrobin	3				
Bifenazate	7				
Boscalid	3				
Clothianidin	0.01*				
Cyhalothrin (includes lambda- cyhalothrin)	0.2				
Cypermethrin (includes alpha- and zeta-cypermethrin)	0.7				
Deltamethrin	0.2				
Flubendiamide	2				
Pirimicarb	0.7 (except soya beans)				
Spinozad	0.3				
Spirotetramate	1.5				
Thiamethoxam	0.01*				
Acephate		5			
Acetamiprid		0.4	0.3		0.3
Bentazone		0.01*	0.01*	1.5	
Chlorantraniliprole		0.8		2	0.05
Chlopyrifos				0.01	
Clethodim		0.5*			
Cycloxydim		15			15
Cyprodinil		0.7	0.06		
Cyproconazole					0.01
Difenoconazole		0.7		0.7	
Dimethoate				1	
Emamectin benzoate		0.1			
Fludioxonil		0.6	0.4	0.3	0.03
Fluxapyroxad		2	0.09	2	0.09
Haloxifop		0.5		0.7	1
Imidacloprid		2		5	2
Malathion		1			
Metalaxyl					0.05*
Methamidophos		1			
Methidathion				0.1	
Methiocarb				0.1	

Pesticide	CXL (mg/kg)				
	VP 0060 ^{1/} Legume vegetables	VP 0061 Beans (<i>Phaseolus</i> spp.)	VP 0062 Beans, shelled (<i>Phaseolus</i> spp.)	VP 0063 Peas (<i>Pisum</i> spp.; <i>Vigna</i> spp.)	VP 0064 Peas, shelled (<i>Pisum</i> spp.; <i>Vigna</i> spp.)
Methomyl		1		5	
Methoxyfenozide			0.3	2	0.3
Penthiopyrad		3	0.3	3	0.3
Permethrin					0.1
Pyraclostrobin				0.02*	
Spinetoram		0.05			
Saflufenacil				0.01	0.01
total	12	18	7	16	13

^{1/} The CXLs of VP 0060 -Legume Vegetables apply to all commodities in this group including beans, *Phaseolus* spp. and peas *Pisum* spp. and *Vigna* spp.

Table 3: CXLs for pulses related to *Pisum* spp., and *Vigna* spp., and *Phaseolus* spp.

Pesticide	CXL (mg/kg)		
	VD 0070 ^{2/} Pulses	VD 0071 Dry beans (<i>Phaseolus</i> spp.)	VD 0072 Dry peas (<i>Pisum</i> spp.; <i>Vigna</i> spp.)
Azoxystrobin	0.07 (except soya beans)		
Bifenazate	0.3		
Boscalid	3		
Chlorothalonil	1		
Clothianidin	0.02		
Cyhalothrin (includes lambda-cyhalothrin)	0.05		
Cypermethrin (includes alpha- and zeta- cypermethrin)	0.05		
Deltamethrin	1 (Po)		
Flubendiamide	1		
Imidacloprid	2 (except soya beans)		
Paraquat	0.5		
Penthiopyrad	0.3 (except soya beans)		
Piperonyl butoxide	0.2 (Po)		
Pirimicarb	0.2 (except soya beans)		
Prothioconazole	1 (except soya beans)		
Pyrethrins	0.1 (Po)		
Saflufenacil	0.3		

Pesticide	CXL (mg/kg)		
	VD 0070 ^{2/} Pulses	VD 0071 Dry beans (<i>Phaseolus</i> spp.)	VD 0072 Dry peas (<i>Pisum</i> spp.; <i>Vigna</i> spp.)
Spirotetramate	2 (except soya beans)		
Thiamethoxam	0.04		
Aldicarb		0.1	
Bentazone		0.04	
Bifenazate		0.3	
Carbendazim		0.5	
Clethodim		2	
Cycloxydim		30	30
Cyproconazole		0.02*	0.02*
Cyprodinil		0.2	
Cyromazine		3	
Dimethenamid-P		0.01*	
Diquat		0.2	0.3
Disulfoton		0.2	
Etofenprox		0.05	
Fludioxonil		0.5	0.07
Flupyram		0.07	
Fluxapyroxad		0.3	0.4
Glyphosate		2	5
Haloxifop		3	0.2
Iprodione		0.1	
Malathion		2	
MCPA			0.01*
Methidathion		0.1	0.1
Methiocarb			0.1
Methomyl		0.05	
Methoxyfenozide		0.5	5
Novaluron		0.1	
Parathion-Methyl		0.05*	0.3
Permethrin		0.1	
Phorate		0.05*	
Propargite		0.3	
Pyraclostrobin		0.2	0.3
Quintozene			0.01
Sulfoxaflor		0.3	
Tebuconazole		0.3	
total	19	31	14

^{2/} The CXLs of VD 0070- Pulses apply to all commodities in this group including beans, *Phaseolus* spp. and peas *Pisum* spp. and *Vigna* spp.

8. If the proposed revised classification for Legume Vegetables and Pulses is adopted, the CXLs VP 0063-Peas (pods and succulent seeds) (total 16 CXLs), VP 0064-Peas, shelled (succulent seeds) (total 13 CXLs) and VD 0072-Peas (dry) (total 14 CXLs) will no longer be applied to the *Vigna* spp. (altogether 43 CXLs). Without these CXLs, it may lead to the problems in the international trade of the commodities of *Vigna* spp.

Analysis of the possibility on how to apply the existing CXLs for *Vigna* spp.

Principle of extrapolation

9. FAO (2009) has published the guidelines for submission and evaluation of pesticide residues data for the estimation of maximum residue levels in food and feed. In the Section 6.8 of the Guidelines, Extrapolation of Residue data to Minor Use, the decisions to extrapolate from one or more major crops to minor crops are taken by JMPR and are on a case-by-case basis when adequate information is available. Adequate information includes information on GAP for the relevant crops, a reference to the residue data used to support the original MRL, and an explanation of the logic for the extrapolation. In the Principles and Guidance on the Selection of Representative Commodities for the Extrapolation of maximum Residue Limits for pesticides to Commodity Groups (CAC/GL 84-2012), a representative commodity can be selected by several criteria of the similarity of the related commodities within a group or subgroup including morphology, growth habit, pest problems and edible portion.

Morphology/growth habit

10. Smýkal et al. (2015) stated that the *Vigna* species were grown in warm temperate and tropical regions globally. The genera *Phaseolus* L. and *Vigna* Savi were also a member of the family Leguminosae (=Fabaceae), subfamily Papilionoideae, tribe Phaseoleae, subtribe Phaseolinae. Thus, the most remarkable homologous series could be seen in the genera *Phaseolus* and *Vigna*. (Smartt, 1975). Asian *Vigna* (subgenus *Ceratotropis*) was categorized as *Phaseolus* until 1970 (Verdcourt, 1970). The tribe Phaseoleae was generally recognised by its twining habit and trifoliolate leaves with asymmetrical lateral leaflet margins, though not all taxa have all three characters. Consequently, it can be implied that morphology of these two genera are similar. However, the minor differences of *Vigna* spp. and *Phaseolus* spp. were pollen structure and the details of its style and stipules (Verdcourt, 1970). The differences among *Phaseolus* spp. and *Vigna* spp. were observed in the ultra-structure of the exine, which was columellar in *Phaseolus* and granular in *Vigna* (Maréchal et al., 1978 and Maxted et al., 2004). The certain infrageneric groupings of these were recognised in the classification of Verdcourt (1970), modified by Maréchal et al. (1978) and Maxted et al. (2004), which is now generally regarded as the accepted classification for the *Phaseolus-Vigna* complex.
11. The above details of biosystematics of the *Phaseolus* spp. and *Vigna* spp. show that the distinction used for classification of these genera are related to some morphological structure which is not relevant to the factors affecting the pesticide residues
12. The growth habit, including florescence biological habit, reproductive stage and harvesting period are similar between *Phaseolus* spp. and *Vigna* spp.

Pest problems and pesticide use pattern

13. The major pests and diseases of *Vigna* spp. are the same as those of *Phaseolus vulgaris* (q.v.) which is the most widely cultivated species of *Phaseolus*. (Purseglove, 1984). The similarities are not only the pests and diseases, but also are the stage of infestation. Thus, the use patterns of pesticides are similar. The examples of the pests and diseases of these two genera are as follows:

- Pests:

- During cultivation bean aphid (*Aphis craccivora* Koch), bean butterfly (*Lampides boeticus* L., Bean pod borer (*Maruca testulalis* (Hubner)), bean fly (*Melanagromyza phaseoli* (Coq.)),
- During storage: Beans weevils (*Bruchus* spp.)

- Diseases: Anthracnose (*Colletotrichum lindemuthianum* (Sacc. & Magn.)), Fusarium root rot (*Fusarium oxysporum*)

Recommendations

14. Based on the above impact and data analysis, the following recommendations are proposed for consideration by the Committee.
- (1) To agree on the extrapolation and application of the CXLs of *Phaseolus* spp. immature beans (VP0061, VP0062) and dry beans (VD 0071) to *Vigna* spp. immature beans (VP2840, VP 2843) and dry beans (VD 2891).;
 - (2) To combine Beans, scientific named *Phaseolus* spp. and Beans scientific named *Vigna* spp. into the same code, which will be read as follows:

Group 014 Legume vegetables**Subgroup 14A Beans with pods**

VP 0061 **Beans** (*Phaseolus* spp.; *Vigna* spp.) (young pods and succulent seeds)

Subgroup 14C Succulent beans without pods

VP 0062 **Beans without pods** (*Phaseolus* spp.; *Vigna* spp.) (succulent seeds)

Group 015 Pulses**Subgroup 015A Dry beans**

VD 0071 **Beans** (*Phaseolus* spp.; *Vigna* spp.) (dry).

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